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PATENTS
LT-5. REISSUE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION FOR REISSUE
OF U.S. PATENT NO. 4,823,070

Issued : April 18, 1989
Inventor : Carl T. Nelson
Title : SWITCHING VOLTAGE REGULATOR CIRCUIT
Assignee : Linear Technology Corporation

Hon. Commissioner of Patents
and Trademarks
Washington, D.C. 20231

MAR 30 1995

SUPPLEMENTAL REISSUE DECLARATION

GROUP 210

Sir:

I, CARL T. NELSON, the named inventor of United States Patent No. 4,823,070, and the applicant for reissue thereof, declare that:

1. I am a citizen of the United States residing at 1167 Settle Avenue, San Jose, California 95125.
2. I have reviewed and understand the contents of the specification of the present reissue application, including the claims, as amended by: the Response to Examiner's Action dated February 24, 1992; the Response to Examiner's Action dated March 7, 1994; and the Response to Examiner's Action dated March 9, 1995, and verily believe that I am the original, first and sole inventor of the "Switching Voltage Regulator Circuit" invention described and claimed in that application and for which reissue is being sought.
3. I do not know and do not believe that said invention was ever known or used in the United States before my invention thereof, or patented in any country before my invention thereof, or more than one year prior to the filing date of August 3, 1987 of my application Serial No. 07/082,989

which matured into Letters Patent No. 4,823,070 ("the '070 patent"), or in public use or on sale in the United States more than one year prior to said application filing date, and that the subject matter of application Serial No. 07/082,989, filed August 3, 1987, was not patented or made the subject of an inventor's certificate prior to said application filing date in any country foreign to the United States on any application filed by me or my legal representatives or assigns more than twelve months before said application filing date. I do not claim foreign priority benefits under Title 35, United States Code, Section 119.

4. I make this declaration under 37 C.F.R. § 1.175 in support for this application for reissue.

5. Upon information and belief, the '070 patent is partly inoperative by reason of my having claimed, as the patentee, less than I had a right to claim, in that the claims of the patent include limitations that were not and are not required to patentably distinguish my invention over the prior art.

6. In the first declaration that I made in support of the present reissue application (dated April 5, 1991 and entitled "REISSUE DECLARATION AND POWER OF ATTORNEY"), I identified unnecessary limitations in the claims of the patent directed to an integrated circuit having "at most" five terminals for implementing a switching voltage regulator (see, e.g., ¶ 5 of my April 5, 1991 declaration). Reissue claims 82-85, which did not include these unnecessary limitations but which still recited "at most" five terminals, were presented to overcome the defects in these original patent claims.

7. In the second declaration that I made in support of the present reissue application (dated March 7, 1994 and entitled "SUPPLEMENTAL REISSUE DECLARATION"), I identified

unnecessary limitations in other claims of the '070 patent (see, e.g., ¶ 6 of my March 7, 1994 declaration). Reissue claims 86-92, which did not include the unnecessary limitations, were presented in this application to overcome the defects in these other patent claims.

8. Reissue claims 82-92 all recite a current-mode switching voltage regulator integrated circuit incorporating a power switching transistor, duty cycle control means or circuitry, current sense signal means or circuitry, error signal means or circuitry, and means or circuitry for comparing the current sense and error signals to provide a control signal for the power switching transistor.

9. Regarding the means and circuitry recited in reissue claims 82-92, there are features of my invention that are disclosed in the '070 patent but not described with particularity in the reissue claims as initially presented. These features are as follows:

a. None of reissue claims 82-92 recites that the current sense signal means or circuitry includes an amplifier coupled to the current sense resistor or resistive element, as disclosed, e.g., in FIG. 1 of the '070 patent and at col. 5, lines 34-39.

b. None of reissue claims 82-92 recites a variable drive circuit for the switching transistor, as disclosed in my patent application Ser. No. 932,014 (now U.S. Patent 4,755,741), the disclosure of which is incorporated by reference in the '070 patent at col. 5, lines 8-13.

c. None of reissue claims 82-92 recites a reference circuit coupled to provide a reference signal to the error signal circuitry, as disclosed, e.g., in FIG. 1 of the '070 patent and at col. 5, lines 47-55.

d. None of reissue claims 82-92 recites shutdown circuitry that deactivates the reference circuit coupled to provide a reference signal to the error signal circuitry, as disclosed, e.g., at col. 10, lines 51-57 of the '070 patent.

e. None of reissue claims 82-92 recites my invention in terms that allow for more than five integrated circuit terminals as long as those terminals require connection to no more than five different nodes among external components to implement a current-mode switching regulator circuit. Independent reissue claim 82 recites that the integrated circuit has "at most" five terminals, thus not allowing for more than five terminals. Independent reissue claims 86 and 89, on the other hand, do not limit the number of terminals but they also do not recite that my invention keeps the required number of external connections down to no more than five. An integrated circuit incorporating the circuitry of my invention may be provided with additional terminals for features not required to implement a current-mode switching regulator. Such additional terminals may be left unconnected, or may be connected to nodes among the external components to which the first five terminals are connected. Thus, despite the added terminals the integrated circuit would still be capable of implementing a current-mode switching regulator requiring connections to no more than five different external nodes, and is therefore within the scope of my invention as disclosed in the '070 patent (e.g., at col. 3, lines 14-18).

10. Upon information and belief, the '070 patent does not contain any claim of comparable scope to reissue claims 82-92 as initially presented for the reasons I discussed in my first and second declarations. As a result, the '070 patent is partly inoperative in that none of the features of my

invention described in ¶ 9(a)-(e) above is recited in a claim of the scope of the reissue claims.

11. Independent reissue claims 82, 86 and 89 are amended in the response submitted concurrently with this declaration to recite the features described in ¶ 9(a)-(e) above, thus overcoming the defects of the '070 patent. More particularly, reissue claim 82 has been amended to recite that the "means ... for generating a current sense signal" includes "an amplifier coupled to the resistive element." Similarly, reissue claims 86 and 89 have been amended to recite that the "circuit ... for generating a current sense signal" includes "an amplifier coupled to the resistive element."

12. Reissue claim 86 also has been amended to recite "a driver circuit coupled to provide a base drive current to the switching transistor," to which the duty cycle control circuit and the error signal circuit are coupled, wherein "the driver circuit is responsive at least in part to the error signal for causing the base drive current provided to the switching transistor to vary so as to increase the efficiency of operation of the switching transistor."

13. Reissue claim 86 further has been amended to recite "a reference circuit coupled to provide the reference signal to the circuit for generating an error signal," and to recite that shutting down the integrated circuit includes "deactivating the reference circuit."

14. Reissue claim 89 also has been amended to recite that "the integrated circuit terminals require connection to no more than five different nodes among the external components to implement a current-mode switching regulator circuit."

15. I understand that, in the Office Action dated September 9, 1994, the Examiner disagreed with the description of a shutdown terminal in reissue claims 86-88 and 90-92 as

initially presented. In my opinion this description is a limitation that is not required to distinguish my invention over the prior art, and can be removed from the claims to avoid further dispute over the form of the claims. Accordingly, the description of a shutdown terminal has been removed from the recited shutdown circuitry of amended claim 86. The reference to a shutdown terminal likewise has been removed from amended claim 87, which depends from claim 86. Amended claim 87 now recites that "the circuit for placing the integrated circuit into a shutdown state is responsive to a signal externally applied to the compensation terminal."

16. Reissue claims 90 and 91, which as initially presented described a shutdown terminal in the same terms as claims 86 and 87, respectively, are amended in the same manner as amended claims 86 and 87 to remove this description.

17. The foregoing errors arose from inadvertence, accident or mistake, and without any fraudulent or deceptive intention, through my efforts during the preparation and prosecution of the application for the '070 patent to particularly point out and distinctly claim my invention based upon my understanding of the invention.

18. The foregoing errors were discovered during or about February-March 1995, while the present reissue application was being studied by me, counsel for Linear Technology Corporation (the assignee of the '070 patent) and Robert C. Dobkin (Vice President, Engineering, of Linear Technology Corporation), during a review of the reissue application in connection with the Office Action dated September 9, 1994 and an investigation of the '070 patent's potential infringement by a third party, and in anticipation of litigation.

19. I hereby acknowledge my duty to disclose to the Patent and Trademark Office information of which I am aware that is material to patentability of the claims of this reissue application in accordance with Rule 56 of the Patent Office Rules (i.e., 37 C.F.R. § 1.56(a)).

20. Applicant hereby appoints LAURENCE S. ROGERS, ESQ., Reg. No. 28,465, MARK D. ROWLAND, ESQ., Reg. No. 32,077, and ROBERT W. MORRIS, Reg. No. 36,613, all of the law firm of Fish & Neave, which has an office at 1251 Avenue of the Americas, New York, New York 10020-1104, telephone (212) 596-9000, as his principal attorneys and agent of record in connection with the captioned patent and this application for reissue, with full power of substitution and revocation and to prosecute this application for reissue and to transact all business in the Patent and Trademark Office in connection therewith. All correspondence and telephone calls should be directed to:

Mr. Laurence S. Rogers
FISH & NEAVE
1251 Avenue of the Americas
New York, New York 10020-1104
Tel.: (212) 596-9000

21. I hereby declare that I understand the English language, and that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and the such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Executed MARCH 9, 1995
(Date)

Carl T. Nelson
Carl T. Nelson

I Here:
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Name of

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Date of Signature

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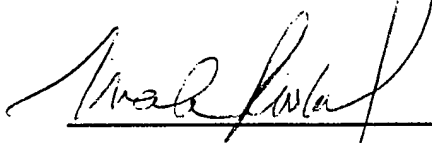
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MARCH 9, 1995
Date of Signature

- ☐ A check in the amount of \$_____ in payment of the filing fee is transmitted herewith.
- ☒ The Commissioner is hereby authorized to charge payment of any additional filing fees required under 37 C.F.R. § 1.16, in connection with the paper(s) transmitted herewith, or credit any overpayment of same, to deposit Account No. 06-1075. A duplicate copy of this transmittal letter is transmitted herewith.
- ☐ Please charge \$_____ to Deposit Account No. 06-1075 in payment of the filing fee. A duplicate copy of this transmittal letter is transmitted herewith.

EXTENSION FEE

- ☒ The following extension is applicable to the Response filed herewith; ☐ \$110.00 extension fee for response within first month pursuant to 37 C.F.R. § 1.17(a); ☐ \$360.00 extension fee for response within second month pursuant to 37 C.F.R. § 1.17(b); ☒ \$870.00 extension fee for response within third month pursuant to 37 C.F.R. § 1.17(c); ☐ \$1,320.00 extension fee for response within fourth month pursuant to 37 C.F.R. § 1.17(d).
- ☒ A check in the amount of ☐ \$110.00; ☐ \$360.00; ☒ \$870.00; ☐ \$1,320.00; in payment of the extension fee is transmitted herewith.
- ☒ The Commissioner is hereby authorized to charge payment of any additional fees required under 37 C.F.R. § 1.17 in connection with the paper(s) transmitted herewith, or to credit any overpayment of same, to Deposit Account No. 06-1075. A duplicate copy of this transmittal letter is transmitted herewith.
- ☐ Please charge the ☐ \$110.00; ☐ \$360.00; ☐ \$840.00; ☐ \$1,320.00; extension fee to Deposit Account No. 06-1075. A duplicate copy of this transmittal letter is transmitted herewith.



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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to Commissioner of Patents and Trademarks, Washington, D.C. 20231, on march 9, 1995

Dalene Quiachon - Rosen
Name of Person Signing Certificate

Dalene Quiachon - Rosen
Signature of Person Signing Certificate

march 9, 1995
Date of Signature